

What is claimed is:

1. A method in a time division duplex mobile communication network comprising the steps of:

estimating a propagation delay between a base station and a plurality of mobile stations in the time division duplex mobile communication network;

arranging time slots in a frame in the time division duplex mobile communication network so that if the propagation delay between the base station and a first mobile station is less than the propagation delay between the base station and a second mobile station, the first mobile station is permitted to transmit in a time slot before the time slot of the second mobile station in the frame; and

where the frame has a guard time between transmissions from the base station to the mobile stations and transmissions received by the base station from the mobile stations, setting the guard time in the frame to a value based on the propagation delay between the base station and the first mobile station.

2. The method of claim 1 further comprising the step of transmitting messages to the mobile stations including information specifying the frame for each mobile station.

3. The method of claim 1 wherein the frame in the time division duplex communication system comprises an uplink superframe and a downlink superframe, the uplink superframe further comprising a plurality of uplink time slots for the plurality of mobile stations.

4. The method of claim 1 wherein the value of the guard time is based on a round trip propagation delay between the base station and the first mobile station.

5. The method of claim 1 wherein the value of the guard time is based on a two times a single trip propagation delay between the base station and the first mobile station.

6. The method of claim 1 wherein the first mobile station is closer to the base station than the other mobile stations.

7. A method of operating a base station in a time division duplex mobile communication network comprising the steps of:

transmitting in a downlink superframe, the downlink superframe further comprising a plurality of downlink time slots, each downlink time slot allocated to a mobile station in the time division duplex communication network;

waiting a guard time interval, the guard time interval at least equal to or greater than a round-trip propagation delay between the base station and a first mobile station; and

receiving uplink transmissions in an uplink superframe, the uplink superframe further comprising a plurality of uplink time slots, each uplink time slot allocated to a mobile station in the time division duplex communication network, the uplink time slots arranged so that a first uplink time slot at the beginning of the uplink superframe is allocated to the first mobile station, the first mobile station selected so that the round-trip propagation delay between the base station and the first mobile station is shorter than at least one other mobile station in the time division duplex communication network.

8. The method of claim 7 wherein the first mobile station has a shorter round-trip propagation delay to the base station than the other mobile stations in the time division duplex communication network.

9. A base station comprising:

a propagation delay computation module for estimating a propagation delay between the base station and a plurality of mobile stations;

a time division duplex frame layout module which can receive the propagation delays between the base station and the plurality of mobile stations and which arranges allocation of uplink time slots in a time division duplex frame so that a mobile station

with a shorter propagation delay than at least one other mobile station is allocated an uplink time slot earlier than the other mobile stations and which sets a guard time interval in the time division duplex frame to a value based on the propagation delay between the base station and the mobile station; and

a time division duplex control module which is adapted to select between a transmit mode and a receive mode based on the time division duplex frame.

10. A mobile station with a time division duplex control module operative to select between an uplink transmit mode and a downlink receive mode based on a time division duplex frame specified by a base station, the time division duplex control module selecting the uplink transmit mode at the beginning of an uplink superframe in the time division duplex frame if an estimated propagation delay between the mobile station and the base station is less than at least one other mobile station in a time division duplex communication network.

11. The mobile station of claim 10 wherein the uplink transmit mode is selected at the beginning of the uplink superframe in the time division duplex frame if the mobile station is closer to the base station than the other mobile stations in the time division duplex communication network.